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PAPERS  
IN  
MECHANICS.

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*The GOLD MEDAL of the Society was this Session voted to Mr. MATTHEW COOKE, No. 10, Winchester-row, Paddington, for his Invention of an Apparatus, by means of which Blind People can both learn and teach Music. The following Communication was received from him, an Explanatory Engraving is annexed, and a complete Apparatus is preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society of Arts, &c. an apparatus which I have lately invented; also a brief explanation of the utility of this contrivance, called by me "The Blind Musician's Guide."

L 4

This

This apparatus is for the purpose of instructing blind persons in the theory of music, and might, with propriety, be termed, *The Blind Musician's Book*, since it will enable all persons deprived of sight, to become acquainted (by their exquisite sense of feeling,) with every character in music, in less than a week's time, and as they progressively improve in the science, they will, with the assistance of a master, more easily acquire a perfect knowledge of music by this machine, than by any other hitherto invented.

In order to prove the truth of this assertion, let any professor of music examine and compare the new machine, with the wooden apparatus called the Peg Board at present used, and he will instantly perceive the superiority and simplicity of my invention. To speak in general terms of the utility of the new machine, I wish to observe,—

1st. That it displays, at one view, every character in the science of music.

2dly. The introduction of numeral figures is, of itself, of the utmost importance; as for example, when a figure is placed over any note, the blind person will instantly know what particular finger is to be put on the key of the piano-forte, or organ; which improvement alone is of an incalculable advantage. For blind persons, *in general*, finger the keys in a very unskilful manner, which is *one cause* of there being, at present, so many unsatisfactory performers. The great utility of numeral figures, also, appear in performing thorough bass, where the introduction of figures form the ground-work of that admirable system, and it becomes absolutely necessary for the practitioner

tioner to understand, as he will then be enabled to know, from what source the laws of harmony are derived, for without the knowledge and constant use of figures, no person whatever can properly execute on the piano-forte or organ, either a common psalm tune, hymn, or even the most trivial song in a skilful or scientific manner.

The subjoined specimen on the cushion, exhibits a psalm-tune properly figured, and is intended as an illustration of thorough bass. The notes might be also figured, to shew that a particular finger must be put on the identical key of the piano-forte, to which the figured note would allude. By this method, the blind musician would readily acquire a good habit of fingering, and at length would surmount the most difficult passages with ease and freedom.

When the blind pupil hath gained a competent knowledge of thorough bass, the last grand object is the attainment of the exquisite science of composition, for which purpose the machine can exhibit a complete score of the treble cliff, the alto cliff, the tenor cliff; each displayed in their respective order and situation. These will afford the blind student a great scope for study, application, and invention; and under a skilful master he will, by the assistance of this machine, become in due time an honour to his profession while living, and his compositions may benefit posterity after his decease.

3dly. By the aid of this apparatus, any musical professor can instruct a blind person in the science of music; also, in like manner, a blind professor, who may be in the habit of using this machine, can convey instruction not only to a pupil who is blessed with sight, but likewise to the blind.

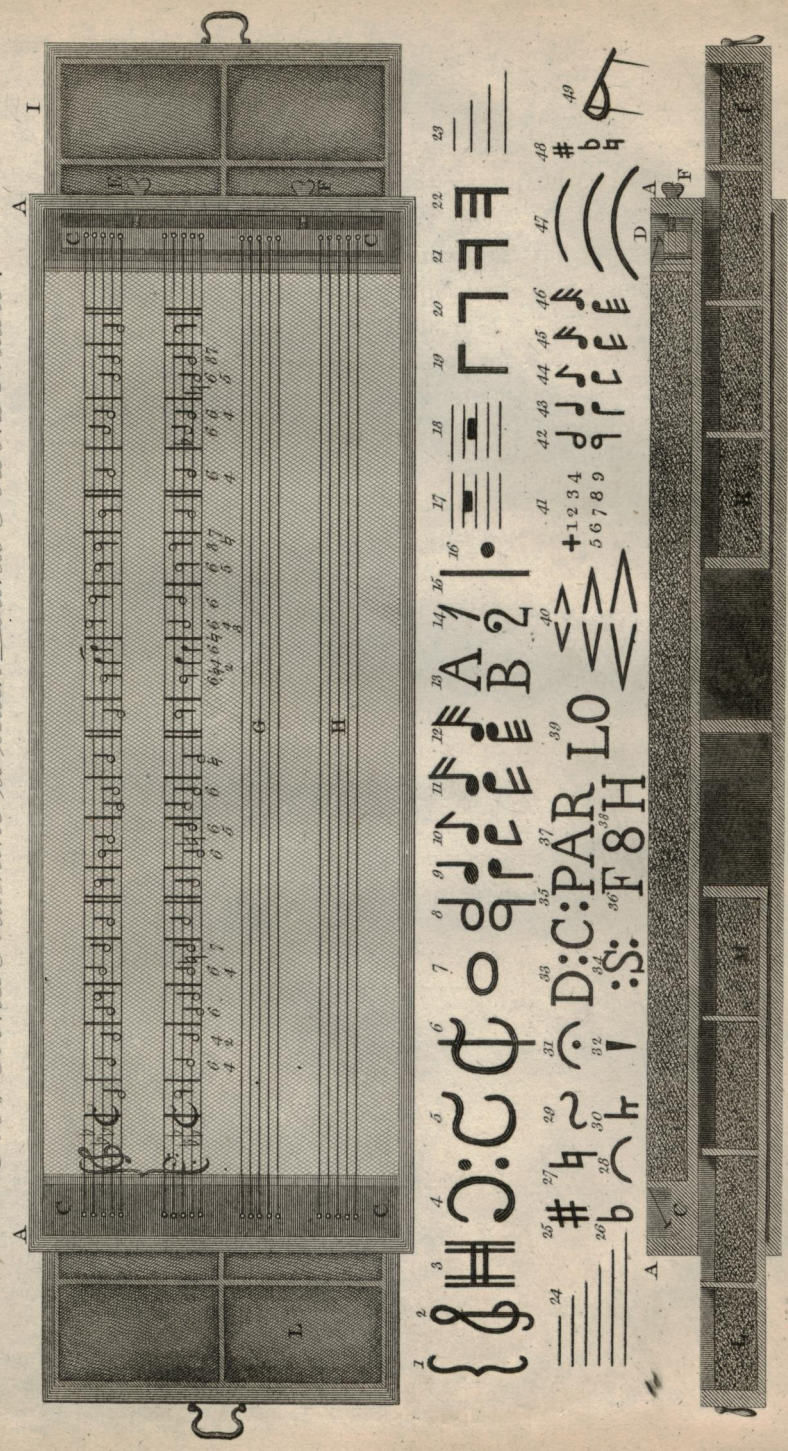
4thly.

4thly. As the various characters in music are known, (generally speaking,) throughout the world, so the new apparatus will be found essentially useful to all blind professors in whatever part of the globe they may reside, and as they are made of brass, they will endure any conveyance, either by sea or land, without injury, or being liable to be out of repair.

5thly. The method of using the different characters is, to put one of the drawers or the boxes on a table to the right hand of the machine, and the other box on the left hand; the blind pupil will then select the various characters he wants, and prick them on the cushion, in the same manner as a compositor arranges his different letters for printing; when the scholar is perfect in his lesson, he may then return each character to its proper place in the drawer, until another lesson is wanted; when he is tolerably expert at this practice, he will be able to fill his cushion with any kind of lesson in about one hour's time.

6thly. The present mode of instructing blind persons in the theory of music, consists in the use of a wooden apparatus or frame-board, perforated with a number of holes, and those holes are filled by moveable pegs, the heads of which are cut into different shapes and forms, to give an idea of musical characters; but this system has been found very intricate and perplexing; this machine is also very limited in its operations, it contains about 600 different pieces, and the variety of its characters are in number 18 only; whereas the new apparatus contains 941 pieces, and the variety of its characters amount to 71. The new machine may be packed in a case 3 feet long; 1 foot 3 inches wide,

*Mr. Cooke's Machine to teach Blind Persons Music.*



Drawn by J. Knyg.

Section. Fig. 2.

Engraved by J. Porter.

wide, and  $4\frac{1}{2}$  inches in depth, the price thereof is 21 l.—  
Invented by,

MATTHEW COOKE,  
Organist of St. George's Church, Bloomsbury.

No. 10, Winchester Row, Paddington,  
London, May 24, 1812.

To C. TAYLOR, M. D. SEC.

*Reference to the Engraving of Mr. COOKE's Apparatus for  
teaching Blind Persons Music. Pl. 3.*

A A shows the surface of the cushion on which the different sets of 5 wires or lines are placed, ready to receive the brass musical characters.

C C C C, the pins on which the four sets of 5 wires are strung.

D, the bar by which a proper tension is given to the strings above-mentioned, by means of the two screws E F.

G H, two blank sets of 5 lines left ready for another tune, the two sets of top lines having a tune placed at present on them.

I, shows one of the drawers which contain the stock of brass musical characters, stuck on cushions ready for use. L is a drawer on the opposite side for the same purpose, both these are shewn partly open.

K M, fig. 2, show the further parts of the same drawers, and the divisions for containing the different characters.

The musical characters are necessarily made without the  
usual

usual fine lines for strength, and have each two pointed wire pins screwed underneath them, one a little longer than the other, as shewn in the character marked 49, which points when pricked into the cushion and upon the lines, retain the character in its place.

The characters are made of sheet brass, cut out by means of proper tools in a fly press.

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*Reference to the Musical Characters on the Engraving,  
Plate 3.*

- No. 1. A Brace.  
 2. The Treble Cliff.  
 3. The Tenor Cliff.  
 4. The Bass Cliff.  
 5. The mark of Common Time.  
 6. A Breve Time.  
 7. A Semibreve.  
 8. Minims, with their tails in two different directions.  
 9. Crotchets with their tails.  
 10. Quavers with ditto.  
 11. Semiquavers with ditto.  
 12. Demi-semiquavers with ditto.  
 13. A specimen of letters for beginners.  
 14. A specimen of figures for divers kinds of time.  
 15. A Bar.  
 16. A Speck or dot.  
 17. A Semibreve Rest.  
 18. A Minim Rest.

19. A



19. A Crotchet Rest.
20. A Quaver Rest.
21. A Semiquaver Rest,
22. A Demi-semiquaver Rest.
23. Tail Pieces, to correct Crotchets into Quavers,  
Semiquavers, and Demi-semiquavers, 4 sizes.
24. Ledger Lines, 6 sizes.
25. A Sharp.
26. A Flat.
27. A Natural.
28. A Tye or Bind.
29. A Turn.
30. A Shake.
31. A Pause.
32. Staccatto.
33. D : C : or Da.
34. : S : A Repeat, or Return.
35. P. Piano.
36. F. Forte.
37. A. R. Arpeggio.
38. 8 H. 8th higher.
39. L. O. Loco.
40. A Geometrical Rhombus < > , its use in music is,  
to encrease the sound, < , and to diminish it, > :  
3 sizes.
- 41 The cross signifies the thumb, and the nine small  
figures are to mark certain passages in per-  
forming lessons, and also for thorough-bass.
42. Small Minims, for Appoggiaturas
43. Small Crotchets, ditto.
44. Small Quavers, ditto.
45. Small Semiquavers, ditto.
46. Small Demi-semiquavers, ditto.

47. Large

- 47. Large Tyes, or Ligatures, 3 sizes.
- 48. A small Sharp, Flat, and Natural, for Appogiaturas.
- 49. Represents a Minim in profile, exhibiting the method of affixing, (or screwing,) two pins to the same, previous to its being stuck on the cushion.

The large notes from No. 8 to No. 12, are about  $\frac{3}{4}$  of an inch in length, and the small notes for Appogiaturas, from No. 42 to No. 46, are one-half of the former dimensions.

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*The GOLD MEDAL of the Society was this Session voted to Mr. THOMAS MACHELL, Surgeon, Wolsingham, near Durham, for an Annular Saw, which can cut deeper than its own center. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument is preserved in the Society's Repository.*

SIR,

I TAKE the liberty to solicit you to lay before the Society of Arts, &c. an instrument which I presume will facilitate several operations in surgery, and which I have named an annular saw. It is particularly well adapted for the division of cylindrical bones, surrounded by muscles, blood vessels

or

or nerves, and with less injury to those parts than by any other instrument in present use.

In operations upon the cranium it has the superiority over the trephine, and Mr. Hay's saw, as it can be applied to the cranium in every form or posture, and remove any depressed portion of bone with the greatest safety and speed. Mr. Cline and Mr. Whatley have seen the instrument, and expressed their opinion that it would be found a very useful instrument in many operations.

My business as a surgeon, and pressing avocations in the country, prevent me from staying more than a few days in London. I should therefore esteem it an additional favor if the Society would soon take it into consideration, that I may personally explain its use.

The principle of this machine will be found useful for many mechanical as well as surgical purposes.

I am,

Sir,

Your humble servant,

THOMAS MACHELL.

London, March 24, 1812.

TO C. TAYLOR, M. D. SEC.

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*Reference to the Engraving of Mr. THOMAS MACHELL'S Annular Saw, which cuts beyond its own own center. Plate 4, Fig. 1, 2, 3, 4, 5.*

FIG. 1, is a view of the saw, its frame, and the wheel-work which actuate it; fig. 2, is an edge view of it; fig. 3, is

3, is a view of part of the interior work, and figs. 4 and 5, a detached view and section of the saw itself.

In fig. 1, A B represents a solid arm or rod of iron, which supports the whole instrument; this rod is fitted up in such a manner, that it can be moved in any direction either to raise or lower it, to move it from right to left, or to lengthen it out endways, so that the joint B at the end of it can be placed in any possible situation within certain limits; this joint connects another piece D with A B, and at the end of this is a joint E, the motion of which is at right angles to the former joint, and it attaches the saw frame F G to it; this frame, see also fig. 2, contains a toothed wheel H, which is turned round by the handle I, and by its teeth actuates a smaller wheel concealed within the frame, but its dimensions are shown by the dotted circle described round the screw *a*, which is its center pin; this wheel turns another *b*, (see the section, fig. 3,) and this moves a third wheel *d*, which has a circle of 6 pins, *c* projecting from its face, and these turn round the saw K, by entering into notches made in its edge, so that it is actuated by its circumference instead of its axis, as is the case with the ordinary *circular* saws; its construction is explained by figs. 4 and 5, in which K is the ring or annular saw, the inside of the hole through it, being as shown in fig. 4, turned out concave, in the latter rather larger than the edges, somewhat like the rim of a spectacle frame; then the internal circle M being accurately fitted into it, is swelled or bulged out by means of a taper mandrell, driven into the hole in its centre to such a size that it will fill the outer ring or circle exactly, in the manner of fig. 4, and then it cannot get out of its place sideways, because the interior circle exactly fills the groove or hollow parts formed round within side the annular saw K, this

Fig. 4.

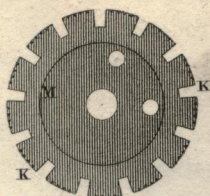
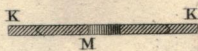


Fig. 5.

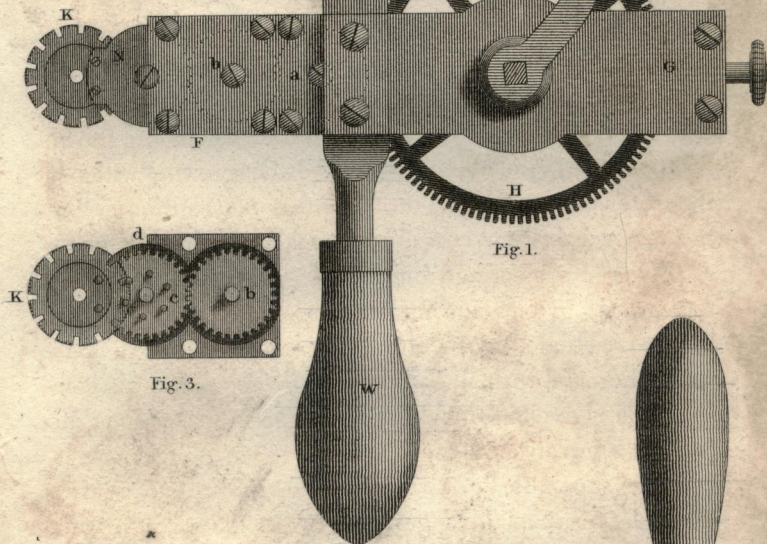


Fig. 1.

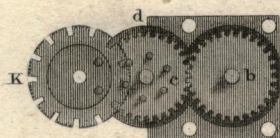
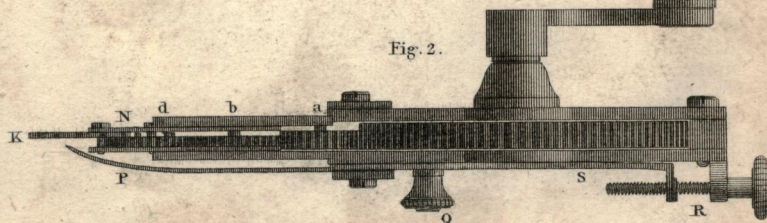


Fig. 3.

*Mr. Tho. Machell's Annular Saw*

Fig. 2.



K, this internal circle M thus becomes the axis on which the saw turns. The circumference of the saw, as shown in fig. 5, is notched all round with fine teeth, which perform the cutting, and at intervals it is cut with deep notches, into which the pins on the face of the wheel *c* are received, and act upon the ring so as to turn it round; the interior ring M, or axis of the saw, is supported by being screwed to a piece of iron, N, which also carries the center pin of the wheel *d*, and is itself screwed to the inside of the brass plates F G of the frame, by the screws shown in figure 1, W is a handle to guide and direct the saw, moving it upon its several joints B and E into any required position; *o* is a spring which in certain positions balances the weight of the frame F G, &c. depending upon the joint B; P, fig. 2, is a gauge consisting of a flat slip of iron, P S, which is fitted to the underside of the frame; it has a groove formed in it through which a screw passes, and the nut Q will fasten it at any required point; it is moved sideways by the screw R, and adjusted to advance to any required distance towards the extreme end of the saw; its use is to regulate the depth to which the saw shall penetrate in cutting.

The very singular property of this annular or circular saw, in cutting deeper than its centre, renders it likely to prove of great utility in a variety of surgical and mechanical operations.

**TEN GUINEAS** were this Session voted to **Mr. WILLIAM BOWLER**, of Holborn Hill, for a Mechanical mode of destroying Rats and other Vermin. The following Communication was received from him, an Explanatory Engraving is annexed, and a Trap on this construction is preserved in the Society's Repository.

SIR,

**I** BEG leave to lay before the Society of Arts, &c. a trap of my invention, made upon such a principle that it will catch any animal, however large or small, and retain it without any possibility of escape.

I remain,

Sir,

Your humble servant,

**WILLIAM BOWLER.**

November 5, 1811.

**TO C. TAYLOR, M.D. SEC.**

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*Reference to the Engraving of Mr. WILLIAM BOWLER's improved Trap for catching Vermin, &c. Plate 5, Fig. 1, 2, 3.*

**A B C**, fig. 1, plate 5, are three boards, forming the bottom and sides of the trap, the latter are united by a cross

cross bar D, E and F are the two doors, moveable on their respective center pins *a b*, so that they will shut down and close the ends of the trap, as shown by the door F, or they may be set open in the manner shown by the door E; it is to be observed, that when the trap is set, both the doors are open, the figure being only drawn in this manner to explain both positions. The doors have a constant tendency to shut down, by the action of two strong springs of iron wire, which press beneath the tails or levers G H, so as to throw them up, and thereby close the doors as at F; these springs are shown separately in fig. 2; both springs are formed of one piece of wire, the two ends, I K, of which are fastened down to the cross bar D, as shown in fig. 1, by means of four wire staples between these, it is formed into two spiral parts L L, and also a crank part, the extremity M of which acts beneath the tails G H of the doors; the catches which hold the doors open are a wire P, which is linked to a staple at *m*, and the other end of which is connected with a wire N, which, as shown in fig. 3, has a tail *p* projecting from it behind, the end of which is hitched under a wire pin or staple, fixed into the side of the trap; now it is plain that this crooked wire by means of its tail, becomes a bent lever, and if the lower end of it be retained from flying sideways from the trap, it will hold down the wire P, and thus hold the two doors of the trap open by confining their tails G H, and in order to do this, the end of the wire N is made tapering, and is retained by means of a small round wire hook *o*, also made tapering, which passing through the side of the box, forms one of the pivots of the moveable board R, within the trap, and the smallest pressure on either end of this board will turn it so far, that the hook *o* will slip beside the tapering end of the



wire N, and suffer the springs to rise and shut down the doors of the trap ; the springs are prevented from flying too far out by pins fixed into the tails of the doors, one of which is shown at M, fig. 2.

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*The SILVER MEDAL and FIFTEEN GUINEAS, were this Session voted to Mr. THOMAS PERRY, of Farnham, in Surry, for his Invention of a Chirographagist, or Instrument intended to form the Hand in Writing, so as to manage the Pen with correctness. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument and specimen of Writing executed therewith, are preserved in the Society's Repository.*

SIR,

I HAVE been induced to trouble you with this note, accompanied with a Chirographagist, from a thorough conviction of its great utility in teaching the art of writing, as it obliges the pupils to sit properly, and effectually prevents them from pressing the stomach or chest against the desk ; were this the only recommendation, it may be desirable as a preservative of health, it being a well known fact, that asthmas and consumptions are frequently increased by the pressure of the chest to persons who write much. By this instrument the hand and pen are confined in their proper positions, by which  
means

means correctness and freedom in the art is more easily attained, and in much less time than without such assistance; the head is also prevented from being too much inclined forward.

I am,

Sir,

Your obedient humble servant,

THOMAS PERRY.

*Commercial Academy, Farnham,  
Surry, Oct. 8, 1811.*

TO C. TAYLOR, M.D. SEC.



SIR,

As I have from extensive practice experienced very great advantages from the use of this machine, I am anxious that it should become generally serviceable in schools; the greatest difficulty which masters meet with in teaching writing, is that of making their pupils hold their pens properly. I have therefore taken the liberty of troubling you with an instrument of my invention for effecting this purpose, should you think it worthy your notice, to submit it to the Society of Arts, which will be conferring a great obligation on me. During these last eight years, more than three hundred pupils have been taught in my own school, who have invariably made use of it; a letter is enclosed written by a child six years of age not intended for inspection, who was taught by this

M 3

instrument.

instrument. The present letter is also written by one of my pupils with the instrument on his hand, aged 14, viz.

HENRY LEGGATT, Pupil.

Signed and approved by,

JOHN ROBERT SCOTT, D. D.

WILLIAM P. JONES, A. B.

THOMAS THATCHER.

TO C. TAYLOR, M. D. SEC.

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*Reference to the Engraving of Mr. THOMAS PERRY'S  
Chirographagist. Plate 5, Fig. 4.*

THIS figure represents a child with the instrument in use; it consists of five pieces of wood fitted together, the principal of which, marked A, is a small flat board of mahogany, lying flat upon the table, and the child's wrist is confined down in a concavity upon it, by a piece of wood F, which is likewise concave, and is united to the piece A by two little straps and buckles, in this an upright piece B is mortised, and an horizontal piece E slides up and down upon it, so that it can be fixed at any height by a thumb screw *a*; in the under surface of the bottom board A, a dove-tailed groove is made, in which the piece G is fitted, and can be slid in and out to any required length, it is not fixed at right angles to the piece A, but inclined thereto in such an angle as is suitable to the hand in writing.

The method of using the Chirographagist, is, to put the hand between the concave boards A F, at almost two inches

*Mr. W. Bowler's Improved Trap.*

PL.V.

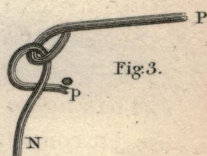
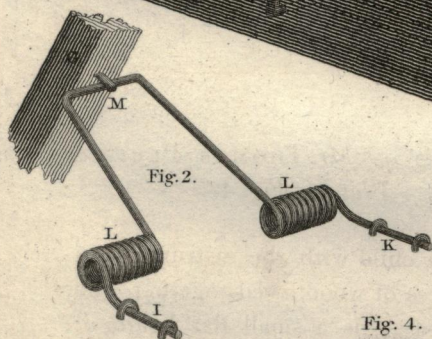
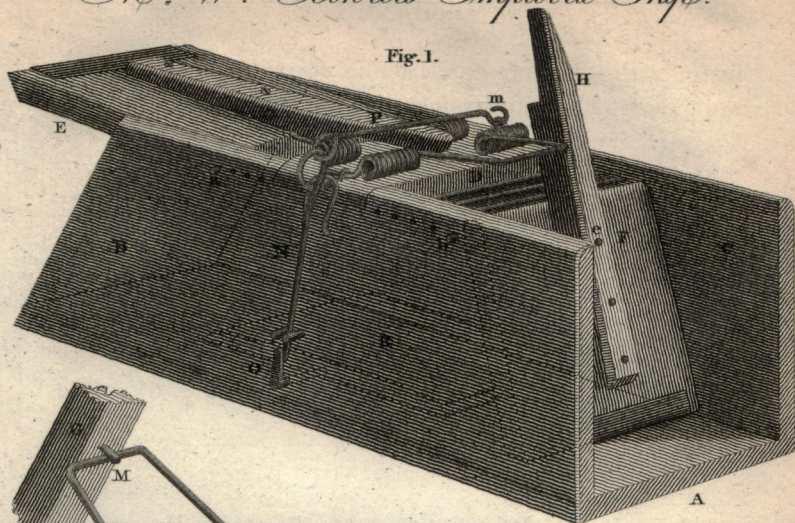
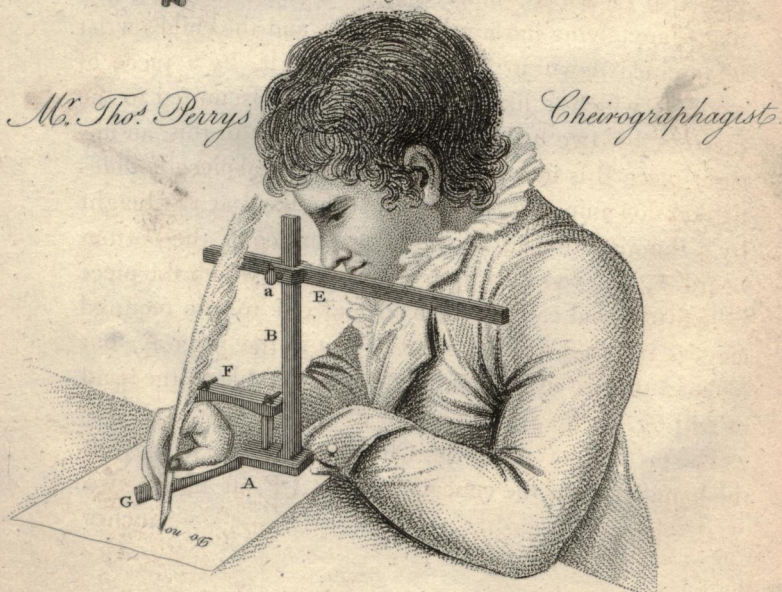


Fig. 4.



*Drawn by J. Farey, Junr.*

*Engraved by S. Threl.*

inches above the wrist, and place the little finger *over*, not upon, the sliding stick *a*, which is to be moved according to the size of the hand, so that the tip of the little finger may be near the end of the stick; the cross bar E, which is to come under the chin of the pupil, is to be screwed on the perpendicular bar B, and the machine be fastened with the straps, only tight enough to prevent the hand turning round.

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*The SILVER MEDAL and FIFTEEN GUINEAS, were this Session voted to Mr. J. Goss, of Enfield, for a Mechanical Instrument to work Addition of Numbers with accuracy and dispatch. The following Communication was received from him, an Explanatory Engraving is annexed, and the Instrument preserved in the Society's Repository.*

SIR,

ABOUT two years ago I resided at Hatherleigh in Devonshire, where I had a day-school, and lodged with people who kept a shop, they had frequent occasion to cast up bills, but having but little knowledge of figures were very liable to make mistakes; they, therefore, when a bill was any way long, generally brought it to me, and oftentimes, when I have been out in the town,

M 4

I have

I have been sent for to come home and cast up a bill ; at length I thought if some mechanical contrivance could be invented to cast up bills, it would be of great service to many, or even to all who are in business. I knew that multiplication, division, and many other rules in arithmetic, were often worked mechanically, but addition being in itself so irregular, I was afraid no instrument could be invented to work it. However, by repeatedly considering the subject, I discovered after sometime a method of casting up a bill by a slide rule about two feet long and two inches broad ; and as I was studying to bring it to greater perfection, an imperfect idea of this addition-wheel sprung up in my mind, which is a much better method than the former, but thinking the experiment would be attended with expense, and after all perhaps be of no advantage to me, it lay dormant in my mind till about last Michaelmas, at which time I came to London, and a friend of mine got me one of the lists of Premiums offered by the Society of Arts, &c. published in the year 1809. After I had read of those honorary and pecuniary rewards which had been given, and were then offered, my desire to obtain some mark of the Society's approbation could not be appeased but by possession, and I was determined to carry my idea into execution ; I immediately renewed my study of this instrument with encreased application.

Casting up bills is what falls to the lot of most people in business, and many who are moderately clever at it, often find it a troublesome task before they can place any dependence on their being right ; they have need to cast them up two or three times, and even then have often as many different sums, and therefore frequently find themselves much confused and puzzled in the operation ; the instrument of my invention in such cases would be very acceptable,

able, it would take the work from the *mind*, and give it to the *hand*, which would perform it with greater ease, accuracy, and expedition; a person who can only *read* figures, may by this help add up a bill with as much accuracy as a mathematician.

The same day I completed my instrument, I showed it to the people with whom I lodged, who as I have already observed were shop-keepers. I wrote a bill, and desired them to cast it up; I then showed them how to do it by my wheel, and desired them to add up the same bill by it, and see if it was right. They then proceeded, and cast it up right by the wheel, when they discovered that they had made a mistake of one shilling in the row of pence, and two shillings in the row of shillings. They were therefore much pleased with my new contrivance, because it was more true and less troublesome than the common way.

This wheel has four circular rows of figures upon its face. The first row which is nearest the teeth on the circumference, denotes *pence*, the second *shillings*, and the third and fourth denote the *total number of pence or shillings*, &c. Thus, if 64 in the third row should be under the index, if I were casting up pence, I should see in the first row, 4 under or next before the index, and the next red figure passed over by the index would be 5, which signify 5s. 4d., the red figure or figures nearest the index signifying *shillings*, and the black figure or figures before the index the odd pence. In the second row, the black figure before the index signifies the number of odd shillings, and the next red figure the number of pounds. Before I begin to work, the red figures 360, 180, 9, 15, must always be placed next before the index, I then be-  
gin

gin to cast up the row of pence. If I should have 5s. 4*d.* I set down the 4*d.* under the bill, and bring back the red figures 360, &c. again before the index; then, with the brass handle I move round the wheel 5 divisions, and go on with the row of shillings, &c.

This addition-wheel has cost me much time and thought, but should it be honoured with the approbation of the Society, I shall feel myself much gratified.

I am,

Sir,

Your humble servant,

J. GOSS.

*No. 4, Wood Street, Spa-fields,  
Jan. 21, 1812.*

TO C. TAYLOR, M. D. SEC.

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DEAR SIR,

**T**HE bearer, Mr. John Goss, of No. 4, Wood Street, Spa-fields, has invented an instrument to work addition, both simple and compound, with unerring accuracy, and as it is quite mechanical, it may be worked by any person who can read figures, and will I conceive, be of use to people in business who are pressed for time.

Mr. Goss will explain it to you, and if you think it will be useful to the public, I will thank you to give him an opportunity of laying it before the Society of Arts, at your earliest convenience, that they may judge  
of



of the merit of the instrument, and confer on Mr. Goss such reward as they shall think proper.

I remain,

Dear Sir,

Your obedient servant,

JAMES ASPINALL.

*Quality-court, Chancery-lane,*  
Jan. 18, 1812.

TO C. TAYLOR, M. D. SEC.

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*Reference to the Engraving of Mr. J. Goss's Instrument to work the Addition of Numbers in Arithmetic. Plate 6, Fig. 1, 2, 3, 4.*

THIS instrument consists of a brass hoop, fixed to a flat circular plane of wood; this hoop is divided on its upper edge into 180 ratchet or saw-like teeth, and the circle has a number of radii lines of figures upon its face, in divisions corresponding with the teeth; also of a supporting circle, having a fixed index reaching across those lines of figures; and a circular row of 20 divisions, and another of 50, correspondent to the ratchet teeth; and of a brass central index which takes into the teeth, and will turn the ring in one direction only, to one certain place or stop; and then, the numbers on the circle, close to the fixed index, will show the sum total of the different numbers to which it has been turned round, at any number of intervals. Fig. 1, is a plan, showing a portion of the moveable hoop and circle, and the numbers which are upon

upon its face. Fig. 2, is a section of the instrument, answering to the same. Fig. 3, is a plan, on a smaller scale, of the instrument on the under side; and fig. 4, an edge view corresponding with it; the same letters of reference are used in all the figures. *AA*, represents the principal upper or moveable circle, on which some of the numbers are marked, this is attached by a centre pin *R*, to another circle *BB*, figs. 2, 3, and 4, which is held in the hand when the instrument is used; these two circles turn round freely upon each other, and upon the centre of the upper one, a radial lever, or index, *CL*, is fixed, which has a free motion round the centre pin *R*. The circle *AA*, has a ring or hoop of brass *MM*, fixed round its circumference, which is cut into 180 serrated teeth, as shown in fig. 2. The centre index *CL*, slips over the sloping side of these teeth when moved in one direction, but when moved in the other, its edge *c* catches into the perpendicular sides of the teeth, and carries the circle round with it. *EE*, fig. 3, are two brass cocks, screwed to the side of the lower circle *BB*, and projecting from it beyond the circumference *M*, of the upper circle, the ends of them support a flat circular wooden or brass limb, *FF*, which (as shown in fig. 1) has other correspondent divisions and figures upon it, over which the index passes; at one end of the limb, a wire stop, *b*, is fixed, and when the index is pressed against this, its edge *c* will stand upon the figure 1, of the limb *FF*, which is numbered on progressively, 1, 2, 3, 4, 5, 6, &c. to 50; which numbers are the same distance apart as the teeth upon the edge of the great circle *A*, so that by moving the index to any of these numbers, its edge *C* will have passed over the same number of teeth of the circle, as the number of the limb which it is carried to denotes; but in passing in  
that

that direction it slips over the sloping edges of the teeth without moving the circle; now, the edge C having arrived at any intended number, as 19, for instance, the edge of the lever is pressed into the teeth, and being brought back again, till it touches the stop *b*, it will have moved the circle A round 19 teeth. At the extreme end of the limb FF, a piece of brass, PP, is fixed, so as to form a reading-index for the numbers on the several circles, which are described on the face of the great circle AA, these are four in number, viz. one for the pence, one for the shillings, and two circles for the pounds, the external circle, which is the pence, is numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, then 1, marked in red, to denote 1 shilling\*: then 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, again, and 2, in red, to denote 2 shillings, and so on, up to 180, which will be 15 shillings; the next circle towards the centre is for the pounds, this is numbered 1, 2, 3, 4, 5, 6, &c. up to 19, then one, in red, for one pound: then 19 numbered successively again, and 2, in red, for two pounds, and so on till 9 pounds, which fills the circle, because 9 pounds contain 180 shillings; the third circle towards the centre is for the addition of pounds, or any other whole numbers; the circle therefore is numbered in regular ascending series, from 1 to 180; but to enable the instrument to count higher than 180, the fourth circle is introduced, this begins at 181, and proceeds, by a regular increase, to 360; G, figs. 3 and 4, is a detent, moveable on a centre pin attached by a stud H, to the lower circle BB, and its tail is pressed by a small spring *h*, which causes it to press constantly upon the under side of the

\* Those figures, which in the instrument are marked in red, the engraver has distinguished, by including them in a small circle.

great circle *A, A*, and produces such a friction as prevents the upper circle slipping loosely round; a screw *k*, fig. 3, is fixed in one part of the under side of the lower circle, so that in turning round, it intercepts the detent *G*, and in this position the edge of the index *P P*, is at the zero, or point of commencement of all the numbered circles. In this position the instrument is ready for use, in the following manner: suppose the following sum is to be added up,

<i>£.</i>	<i>s.</i>	<i>d.</i>
23	14	3
18	5	2
12	3	4
47	6	5
21	4	3
12	3	4
<hr/>		
134	16	9

Having adjusted the instrument as before-described, that is, having brought the circle to the zero, hold the circle *B, B*, in the one hand, and take the end *L*, of the lever *C L*, in the other, then move the end of the lever *C L*, till its edge *c*, cuts the figure 4 of the limb *FF*, which is the first figure in the sum; in this movement the index is held up so as not to touch the teeth, but having arrived at the intended figure, it is pressed down, into the teeth, and is brought back again (the circle with it) until it touches the stop *b*, when it will have moved the circle, so that 4 stands before the index *P*, on the pence circle; then the index *L* is carried back again to 3, the second figure of the sum, and returned to its stop, carrying with it three divisions more; it is next moved to 5, and

*Mr. Goff's Instrument  
to perform Addition.*

Fig. 1.

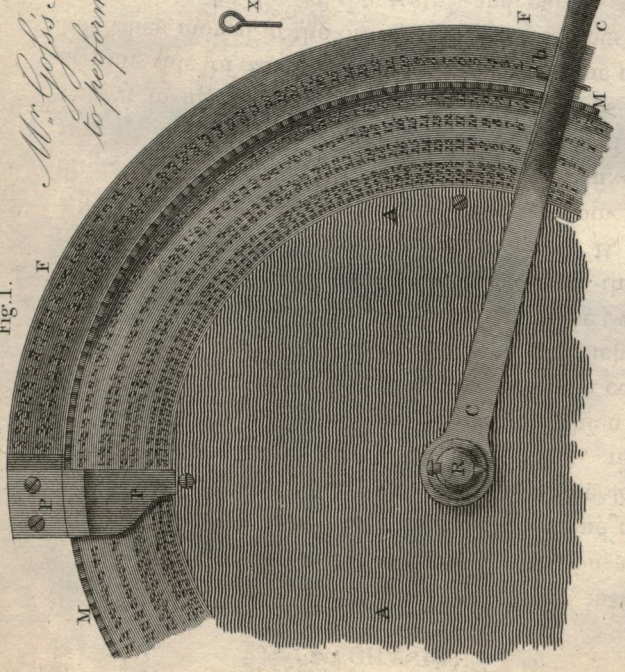


Fig. 3.

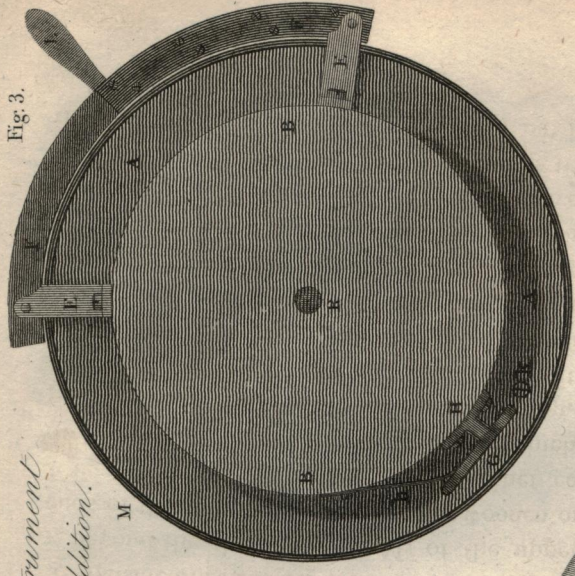


Fig. 2.

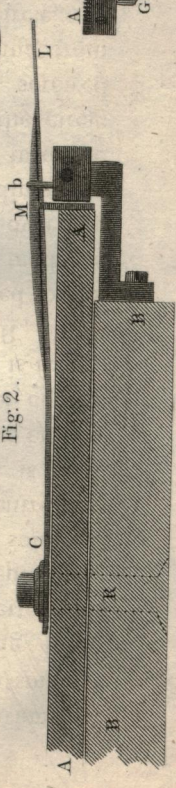
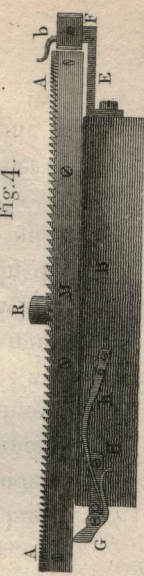


Fig. 4.



*Drawn by J. Eery.*

*Engraved by S. Porter.*

5, and so on, following the pence column, till the number 3, at the top, is counted; then, examining at the edge of the index P P, it will be found to stand at 9, in the pence circle, and the nearest red figure which has passed by the index, will be 1, denoting 1 shilling and 9 pence, therefore 9 must be put down, and 1 carried to the next column; and to recollect this, a small pin, *x*, must be stuck into the hole, No. 1, upon the outside of the limb F; the circle is then returned to the zero, which is readily performed, by turning it backwards as far as it will go, and the stop *k*, fig. 3, prevents its going farther than the right position; the column of shillings is then added up by the same process, taking the numbers 3, 4, 6, 3, 5, 14, by successive steps of the index L; then, on examination of the second, or shillings column, 16 will be found beneath the index, and the nearest red figure which it has passed by will be 1, denoting 1 pound 16 shillings; 16 therefore is set down, and the pin *x* still kept in the same hole to denote that one is carried forwards, the circle is again brought to the zero, by bringing it back as far as it will go; and lastly, the column of pounds is added, in exactly the same manner.

*The*

*The SILVER MEDAL was this Session voted to Mr.*

*JOSEPH DAVIS, of Catharine-street, Strand, for his Invention of a temporary Scaffold, by means of which the outside Walls of Houses may be repaired, or beautified, with equal safety, and at a less expense than usual. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Apparatus is preserved in the Society's Repository.*

SIR,

**H**AVING to repair and beautify the front of my house, which is called the Minor-Theatre, in Catharine-street, Strand, I invented a machine which answers for such purposes much better than a scaffold, and saves considerable expense. As I conceive this contrivance may be beneficial to the public, I should be happy to submit a model thereof to the Society of Arts, &c. for their inspection.

My machine is twenty-six feet long, and cost me two pounds ten shillings, and when no longer wanted for this purpose, the timber is worth two pounds. A single machine may be made thirty-six feet long, and united to any length, and when not in use, may be folded up and put by as a common ladder.

On this plan of a scaffold, there is no occasion to  
break

break up the pavement, or to give the least interruption to passengers in the street.

I am, Sir,

Your most humble servant,

JOSEPH DAVIS.

*Catharine-street, April 14, 1812.*

TO C. TAYLOR, M. D. SEC.

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#### CERTIFICATES.

CERTIFICATES were produced from HENRY HAWBRIDGE, builder; WILLIAM BLACKLOCK, painter; G. FRY, plasterer, and JOHN ROCHLEY, carpenter; stating, that they were workmen employed by Mr. Joseph Davis, at the front of his house, in Catharine-street, and testifying, that his machine is superior to any scaffold they ever worked upon.

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*Reference to the Engraving of Mr. JOSEPH DAVIS's temporary Scaffold for repairing the outsides of Houses. Plate 7, fig. 1.*

THIS simple and effective contrivance, consists of nothing more than a couple of planks, A, to which two others, BB, are nailed, forming a sort of trough, or moveable scaffold, on which the workmen stand; which is suspended at any height at pleasure. CC, DD, are two frames of wood, in which the trough or scaffold is

N

fixed;



fixed; in the top cross-pieces of these frames, two pulleys, E and F, are fitted, and round these the ropes by which the scaffold is suspended are passed; the ends, *aa*, of these ropes, are made fast to two beams, or scaffold poles, G and H, which project out of the upper windows: or they may be fixed over the parapet, or by any other means, as is thought proper; two single pulley blocks, *gg*, are also suspended from these poles, and the rope, after passing under the pulleys, E and F, passes over the pulleys in these two blocks, and the ropes or falls, *h* and *i*, come down to the machine, and are made fast to any convenient part of it; therefore, by drawing these ropes, the workmen can, with the greatest ease, raise or depress the suspended scaffold to any place where it is wanted for work.

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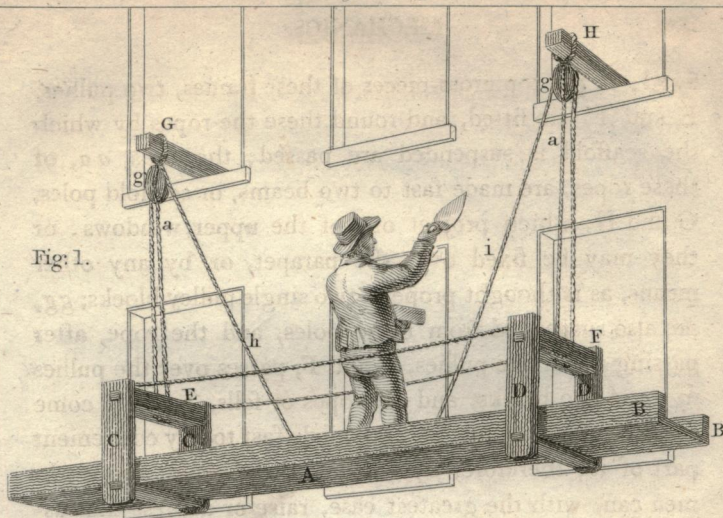
TEN GUINEAS were this Session voted to Mr. JOSEPH MARTIN, No. 176, Fleet Street, for his *Method of relieving a Horse fallen down in the Shafts of a loaded Cart.* The following Communication was received from him, an *Explanatory Engraving* is annexed, and a *Model* is preserved in the Society's Repository.

SIR,

I BEG you will do me the honor to inform the Society of Arts, &c. that I have just now completed an invention

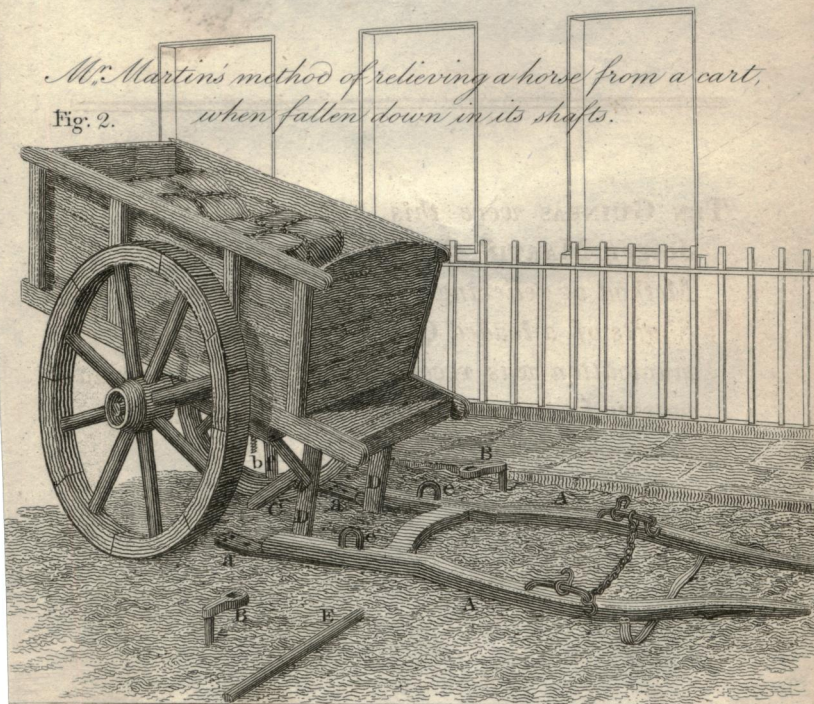
*Mr. J. Davis's temporary Scaffold for Painters, &c.*

Fig. 1.



*Mr. Martin's method of relieving a horse from a cart, when fallen down in its shafts.*

Fig. 2.



to relieve horses when they fall down in the shafts of a heavy loaded cart or carriage, and I will wait upon the Society with a model for inspection whenever they will please to appoint.

Believe me to be,

Sir,

Your most obedient servant,

JOSEPH MARTIN.

176, Fleet Street, Feb. 19, 1812.

TO C. TAYLOR, M. D. SEC.

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*Reference to the Engraving of Mr. JOSEPH MARTIN'S  
Method of relieving a Horse when fallen down in the  
Shafts of a Loaded Cart. Plate 7. Fig. 2.*

FIGURE 2, of plate 7, represents a cart, in which the horse having fallen, has been relieved by detaching the shafts from the cart, which is provided with temporary legs or stays, D D, to support the weight of the front part, and prevent its falling any lower until other means can be resorted to for raising it again.

The figure represents a common cart, A A represent the shafts detached and lying on the ground; the connection is formed with the cart in use by two screw-bolts, one of which is seen at *b*, passing through the bed of the cart, and also through the iron hinges *a a*, by which the shafts are united to the cart; besides these screw-bolts two steady

N 2

pins

pins, or bolts without heads, also pass through holes in the shank of each of the hinges, and two nuts, B B, are screwed on to fasten them when the cart is in use ; but if the horse falls down, so that the weight of the cart comes to rest upon the fore-ends of the shafts, he is confined between them by the weight, and prevented from rising. Mr. Martin's method of relieving a horse in such a situation is thus effected. The locking bar E, is first removed from the staples *ee* of the shafts, with which the body of this, like most other carts, is provided, for the purpose of turning up and discharging its contents ; this being done, a man must creep under the cart from behind, and first put down the legs or stays D D, which were before turned up out of the way beneath the cart, then unscrewing the nuts B B, the shafts fall down, completely detached from the body of the cart, as represented in the figures ; and nothing then prevents the horse from getting up, the cart remaining supported in front by the legs D D ; C is an additional leg folded up beneath the cart, it is of such a length that it will, when set upright, support the cart in an horizontal position, and is used to support the cart when lifted up whilst the shafts are fixed on again ; the legs D D are provided with iron hooks, one of which is seen at F, which retain them steadily in their places, when the weight of the cart tends to throw them forwards ; the leg C is provided with a similar hook.

TEN GUINEAS were this Session voted to Mr. J. KING, No. 4, Mulberry Court, near the Bank, for an Improved Machine, to enable Shoe and Boot-Makers, to work without pressure upon the Breast or Stomach. The following Communication was received from him; an *Explanatory Engraving* is annexed, and the Machine is preserved in the Society's Repository.

SIR,

I HAVE left herewith, a machine to enable shoe and boot-makers to work standing.

From the manner of its construction, the workman can with it hold his boot or shoe much steadier, and do the work readier and better than by any other method that I have seen.

The machines can be afforded for sale at seven shillings each. The machine can easily be fixed to a window by screws, or two or three holdfasts, with a strong foot to support the end to which the foot strap is fixed; but many windows are so convenient as not to require a foot post. A shelf or board fixed near it will hold all the tools. The machine may, if required, be fixed on a small but very strong bench made for the purpose. The lever or stay which lifts up and down, and moves from side to side, is of great use, it will fit either a large or small shoe; when it is down, the shoe is held firm between it and the side of the machine, and kept tight by the foot pressing on the strap. When this lever is thrown back, it leaves room for the heel to go down and rest on the bent stay at the bottom, so that the work at the toe may be done with pleasure; and when any thing is wanting to be worked at the heel, the toe rests on the stay below, and is

in most cases held by the strap. Within two or three months last summer, I sold more than twenty of these machines.

I am,

Sir,

Your humble servant,

J. KING.

*No. 4, Mulberry Court, near the Bank,  
London, March 25, 1812.*

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CERTIFICATES.

WE, the undersigned, have worked with the machine invented by Joseph King, for making boots and shoes standing, and find it much better for the health than sitting, as it prevents many disorders occasioned by the pressure upon the breast or stomach, when making shoes or boots in the common way. From the manner in which this machine is formed, and its cheapness, we believe it to be the most likely of any yet made to become generally useful.

WILLIAM HOLMES, No. 74, King Street, Golden Square.

WILLIAM CAMPS, near Portland Place.

E. DIMOND, No. 10, Mill Hill Mews.

WILLIAM SAMWAYS, Mill Hill Mews.

GEORGE RABNETT, Mill Hill Mews.

HENRY RABNETT, Mill Hill Mews.

WILLIAM ANLEY, No. 7, Gees Court, Oxford Road.

JACOB DAVID, No. 12, Gees Court, Oxford Road.

SAMUEL BEAMONT GOODCHILD, No. 24, James Street.

GEORGE LAKER, No. 17, Silver Street, Golden Square.

HENRY WILLIAMS, Lamp Office Court, Lambs Conduit Street.

WILLIAM WHEELER, No. 89, Shoe Lane.

*Reference*

*Reference to the Engraving of Mr. J. KING's Machine, to enable Shoe and Boot-Makers to work standing, and without pressure upon the Breast or Stomach. Plate 8, Fig. 1, 2, 3.*

FIG. 1, represents a plan of this machine; fig. 2, a perspective view of it in use; and fig. 3, a section through the middle; the machine consists of an oblong frame of wood formed of two sides A B, with cross pieces C D E F it is very conveniently fixed in a situation, and at a proper height for working, by screwing it down to a window cill, (a position of which as shown in fig. 2, at G,) by means of two screws *a a*, such as are used for bedsteads; these, and an iron bracket I, fig. 2, extending from the front, E, of the machine, being screwed against the wainscoat H, support the machine very steadily; or a stand consisting of proper legs may be used if preferred, the parts A B D E F, of the machine, are covered with leather, so as to become like cushions to support the last, as shown at L, fig. 2, and it is held down by a strap M, (in the manner shown by the figure,) which has a loop or treadle at bottom for the foot; the principal novelty of this invention, consists in a lever H, which is attached by an iron link *b*, to a wire *d*, upon which it moves as a centre; and when that is down in its place, as in fig. 1, a small point or beak of iron *d*, fig. 3, enters into holes made in an iron plate *e*, and the other end of the lever comes to rest on a stop *f*, which, as shown in fig. 1, has several holes in it; and the end of H has also a little iron beak which enters these holes, thus when the piece H is shut down, it becomes an immoveable cross bar of the frame, and the last may be held or wedged in, between this and either slide A or B of the frame, in the manner shown by the dotted lines in fig. 1, and may be held down by the strap M; but to adjust the width of the opening H A or H B, on which the last lies, nothing

more is necessary than to lift up the lever **H**, so that the point *d*, fig. 3, clears the holes of the plate *e*, then sliding the link *b*, along the wire *d*, to the intended width, and shutting it down again, the beak or the point *d*, fig. 3, enters some other hole in the plate *e*, and holds the lever **H**, fast in the new position, so as to adapt it to the width of any last, or to hold it in any position at pleasure.

At other times the last is held down in the manner of fig. 2, by the foot-strap **M**, pressing the lever **H** upon it; in fact the machine forms an universal vice, which will support and hold the last firmly down upon the cross-bar **F**, in any required position; *g* and *h*, fig. 1, are very stiff pieces of sole leather fixed in the frame, which, in certain positions, also support the last.

*TWENTY GUINEAS were this Session voted to Mr. DAVID RITCHIE, No. 3, Princes Street, Perceval Street, Clerkenwell, for a Compensation Pendulum, to prevent the Rate of a Clock from varying by Heat or Cold. The following Communications were received from him, an Explanatory Engraving is annexed, and a Model of the Pendulum preserved in the Society's Repository.*

SIR,

I BEG leave to lay before the Society of Arts, &c. for their inspection, the model of an expansion pendulum upon a new construction, the invention of,

Sir,

Your most obedient humble servant,

DAVID RITCHIE.

*No. 3, Princes Street, March 24, 1812.*

TO C. TAYLOR, M. D. SEC.

SIR,



SIR,

**I** SHALL beg leave to point out distinctly such parts of the model sent, as I do not claim as my improvements, and likewise those that I do claim.

Expansion bars have been used by many persons in various ways. The spring balls which correct the expansion bars, have likewise been used. My improvements in this pendulum I consider to be, in the application of the two expansion bars, and the springs that remove the weight of the pendulum ball from the expansion bars; by which the bars may be reduced to the size of the pendulum rod, and exposed equally to the heat and cold; likewise, in having the compensation near the ball, and only one pendulum rod.

DAVID RITCHIE.

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SIR,

**I**N addition to the opinions delivered by many of the trade, at the Committee, in favor of Mr. Ritchie's pendulum, I shall beg leave, for the general information of the Society, to point out more fully its properties.

I shall, however, first mention the principal objections to the compound pendulums now in use.

The Gridiron pendulum has much friction, is difficult to adjust, and from the great weight of the rods, the center of oscillation is much above the center of gravity.

Ellicot's pendulum, in its improved state, is objectionable on account of its friction; Mr. Ward's pendulum  
has

has likewise friction; Mr. Read, of Woolwich's pendulum has friction, and depends upon a doubtful metal, viz. zinc.

Mr. Doughty's pendulum has the whole weight of the ball and two pendulum rods, resting on the extreme ends of a long compound bar, placed at the upper end of the pendulum, which cannot be adjusted without altering the length of the pendulum, and from the weight of the rods and bar, the center of oscillation is considerably above the center of gravity. The late Mr. Grimald  applied a single compound bar to the lower end of a pendulum, but it is now laid aside.

Mr. Ritchie's pendulum has only one steel rod, with two short compound bars of brass and steel, placed near the ball, at right angles to the pendulum rod; the bars, being parallel, admit of perfect adjustments without altering the rate of the clock. A simple contrivance is introduced between the compound bore which takes off the weight of the ball, and leaves them at liberty to contract or expand, free of every incumbrance.

The compound bars may be reduced to the size of the pendulum rod, and will be equally affected by heat and cold. It is free from friction. It has some advantages over the mercurial pendulum, by being portable, and not liable to be deranged. It may be applied to the smallest table clock, or the largest turret. It is likely to be of great public utility, and can be afforded for less than half the expense of the most approved pendulums.

I am, Sir,

Your obedient servant,

THOMAS RAMSAY.

*Islington, April 14, 1812.*

TO C. TAYLOR, M. D. SEC.

*Reference*

*Mr. David Ritchie's*  
*Pendulum.*

Fig. 5.

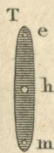
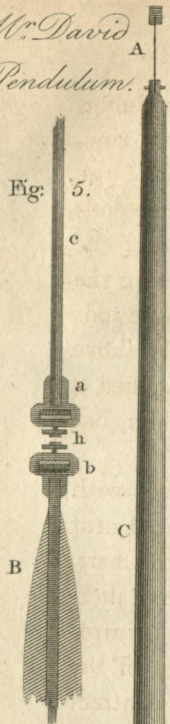


Fig. 4.

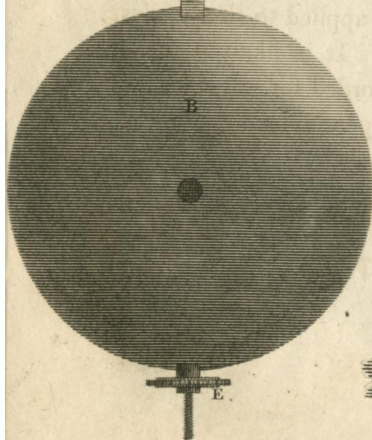
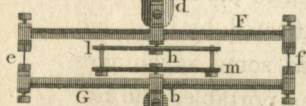
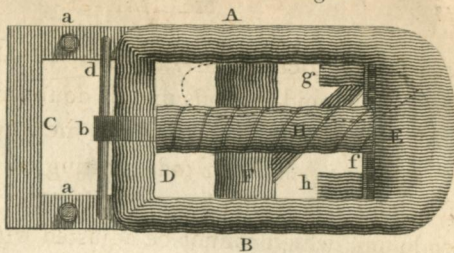


Fig. 1.



*Mr. J. King's Machine*  
*for Shoe-makers.*

Fig. 2.

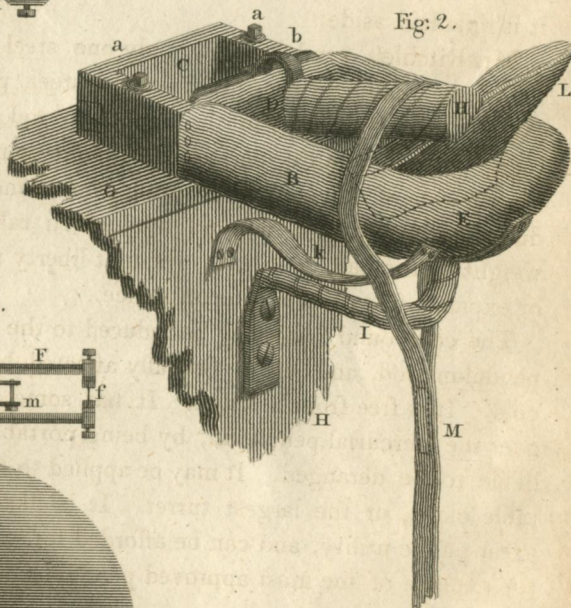
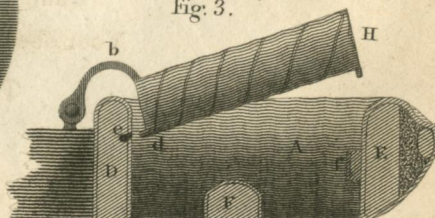


Fig. 3.



*Reference to the Engraving of Mr. DAVID RITCHIE'S  
Compensation Pendulum. Plate 8, figs. 4 and 5.*

THE compensation of this pendulum operates upon the same principle as the compensation balance used in the modern chronometers, namely, the flexure of a bar compounded of two metals, brass and steel, for instance, of different powers of expansion, under any certain degrees of heat. Fig. 4, represents a front view of the pendulum, and fig. 5, an edge view of a part, in which A, fig. 4, is the suspending spring, and B, the ball, C, the steel rod of the pendulum, and E, the screw-nut, by which it is adjusted to time; the compensation part consists of two compound bars, F and G, the former of which is connected by means of a brass socket *a*, which is screwed to the lower end of the rod C; the bar G, is connected by a similar socket *b*, with a short steel rod which passes through the pendulum ball B, and has the nut E tapped upon it; the two bars, F and G, are connected together at both ends, by two pairs of sockets *ef*, one of which is shown detached at R; it consists of two pieces of brass, *ik*, each having a mortise through it, to receive the end of one of the compound bars, and a small screw to fasten them in; the two pairs of brass sockets are connected by a small piece of watch-spring, having a hole drilled in the middle of it. The principal sockets, *d* and *b*, have each a small screw *h* tapped into them, which fixes them upon their respective bars FG: the heads of these screws pass through two small springs, *lm*, one of which is shown separately at T, and the ends of these springs are united by two small screws, *lm*. The intent of these springs is to take off the weight of the ball, and allow the compensation

compensation springs freedom to act. The action of this compensation pendulum is this,—on being heated, the rod C expands, and would let the ball B down farther from the point of suspension, but for the compensation which counteracts this tendency; the bars, FG, are made, as before-mentioned, of brass and steel rivetted together, the upper side of F, and the lower side of G, are steel, as shown by the dark lines, and the adjacent sides of both bars are brass. Now, it is the property of a bar thus compounded of brass and steel, to warp or become convex on the brass side, when heated, in consequence of the greater degree of expansibility of that metal; therefore, in this pendulum before us, when the rod C elongates by heat, the two bars, FG, at the same time both become convex within side, and as the ends are confined a certain distance asunder, by the connecting pieces, *ef*, the two sockets, *db*, approach each other a certain quantity, tending to elevate the ball: and this quantity is adjusted to be equal to the descent which would have been occasioned by the lengthening of the rod C. The adjustment for the quantity of the compensation is made by experiment, altering the quantity of the compensation, by sliding the two connecting pieces, *ef*, nearer to the central rod, which diminishes the quantity of compensation, and by removing them nearer to, or farther from the centre, it may be regulated at pleasure.

*The SILVER MEDAL of the Society was this Session voted to Dr. GEORGE CUMMING, M.D. of Denbigh, in Wales, for his Invention of a Vapour, Fumigation, or Shower-Bath, adapted, at a cheap expense, for the Use of Public Hospitals, or Private Families. The following Communication was received from him, an Explanatory Engraving is annexed, and complete Models of the Apparatus are preserved in the Society's Repository.*

SIR,

HAVING been requested, by the governors of the Denbigh Dispensary, to publish an account of a vapour bath of my contrivance, and which I lately had the honor to present to them, for the use of that charity, it being, in their opinion, well calculated, from its simplicity, cheapness, and efficacy, to bring into general use an agreeable and salutary practice, as well as a powerful remedy in many diseases well known in this country in former times, but till lately neglected, and in a manner forgotten. I beg leave, therefore, to offer it to the attention of the profession, and public in general, through the medium of the Society of Arts, &c. Allow me to assure you, that I do so more with a view of rendering it useful than for the sake of reward.

I am, Sir,

Your obedient servant,

GEORGE CUMMING.

*Denbigh, April 20, 1812.*

TO C. TAYLOR, M.D. SEC.

SIR,

SIR,

HAVING been led to form a very favorable opinion of vapour bathing, and daily meeting with cases that promised to derive benefit from its use, I was induced to send for Dr. Kentish's Treatise, second edition, on that subject, immediately on seeing it advertised; and I need hardly observe, that having never seen such a contrivance, I was much disappointed to find, that he had omitted to describe the nature of the apparatus he employed. Possessing, however, the command of an excellent steam-boiler, with other conveniences, at the Dispensary of this place, I determined to avail myself of them, and, if possible, to erect a bath for myself. To those who have made the economical application of steam an object of attention for culinary purposes, the steps that led to the present contrivance will readily appear, but as there is some resemblance betwixt the bath in question, and that of the Honorable Basil Cochrane's, I beg to state, that mine was contrived in the summer of 1810, and completed in November following, which was some months before I had an opportunity to consult his treatise, or indeed to derive, directly or indirectly, any knowledge whatever of the nature of his apparatus. Finding, however, my bath to answer beyond expectation, I naturally became anxious to know how far it was inferior or superior to those already in use, and Dr. Kentish having condescended to refer his readers to the Honorable Mr. Cochrane's book, as containing plans for vapour-baths, I was induced to send for it to certify myself on that head. Having stated this, I have only to add, that every needless expense and ornament in the following bath I have carefully avoided. My object throughout has been to produce a simple,  
cheap,

cheap, durable, and efficient apparatus. It would not, however, be difficult to point out, that local improvements, for the use of private families, may occasionally be made. For instance, the upper part of the bath might be made to move between upright pillars, something like the bell of a gazometer, and air-tight moveable joints, such as are used for chemical purposes for procuring oxygen, &c. might be substituted for the tin tubes at present used.

I have to observe, that the bath, as it now stands, can be heated to 120 degrees, of Fahrenheit's Thermometer, with the present boiler, &c. in the course of twenty-five minutes, viz. allowing twenty minutes to raise the coldest water to the boiling point, and five minutes to heat the bath from 40 to 120 degrees, when about 12 ounces of water will be found to be collected at the bottom of the bath; but it is worthy of remark, that a simple oblong tin-boiler, of two and a half gallons, (made originally for the topical application of steam, as recommended by Dr. Bardsley, of Manchester) has been found to answer every purpose for my bath, a circumstance that cannot fail to recommend my bath to the attention of private families, for when mounted, as in the model I have sent, it can be moved in one piece, and used in any bed-room or other room where there is a common fire-place.

The expense of heating the bath is so trifling, that several persons may bathe at the cost of one penny.

I need scarcely point out to you, that the bath, in addition to its other advantages, will form an excellent fumi-gating machine for medical purposes, and that the most powerful chemical vapours may be safely thrown into it.

*Description*



*Description of Dr. CUMMING's Bathing Apparatus.*

THE bath is extremely simple, and may be conveniently made of any piece of cooperage, of sufficient dimensions, but nothing can perhaps answer better than a common wine pipe, which, after being well washed, is to be sawn across, about its middle, then to be well scraped and cleaned on the inside, and afterwards placed vertically upon a frame with castors. The upper half (in the top of which an aperture has been previously prepared for the head and neck of the bather) is to be furnished with cords, pullies, and counterpoise, so that by connecting it with any beam, roof, or ceiling, it can be raised or depressed, or in other words, the bath can be opened and shut with the greatest facility.

Upon the margin of the lower piece of the bath there is a groove, three fourths of an inch deep, receiving the circumference of the upper half, and which is thus formed. A strong iron hoop is first put on the outside, and then well driven about half its depth, when a similar one, after being rivetted, is driven to the same depth within.

The groove thus formed is of the first importance, as it not only renders the bath, with the assistance of a little water, steam-tight, but also effectually prevents it from undergoing any change of shape. It may also be observed, that the above hoops are so hammered or set, as to make the groove somewhat wider than the staves upon which they are applied, and that the edge of the upper or moveable piece of the bath is cut with a cooper's knife, so as readily to fall or slip into it.

The boiler is distant from the bath about six feet, and the steam-pipe is made to enter an inch above the bottom,  
and

and to extend itself horizontally to the centre of the same, when with the view of equally diffusing the heat, a piece of coarse linen, or calico, stretched upon a hoop, (with a notch to admit the steam tube) is placed over it. This may be called the diffuser, and is made of a less diameter than the bottom of the bath, in order that the feet of a strong frame or grating, to support the bather, may securely rest upon the bottom of the bath. Immediately over this grating, a floor of split-ash (like a sieve) is laid, and upon this a seat is placed, which is fastened to the side of the bath, by means of a bracket.

This seat serves the bather as a step, as he goes in or comes out of the bath.

To accommodate the various sizes of bathers, light frames, covered with split ash, after the manner of cane-work, may be placed upon the said seat, as required.

The whole of these loose articles may be packed within the bath, when not in use, and placed in proper order, in a few seconds, when wanted.

Such is the general description of a bath that may be made in any village, and which, in point of expense, falls within the purchase of almost every family.

It is simple, cheap, neat, durable, and efficient, and moreover admits of a great variety of applications.

GEORGE CUMMING.

TO C. TAYLOR, M. D. SEC.

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*Reference to the Engraving of Dr. CUMMING's Bathing Apparatus. Plate 9, fig. 1 to 10.*

Fig. 1, A A, Shows a general view of the bath, made of a wine pipe, which divides in two parts at the circle or groove B, at the part shown by dotted lines within the hoop.

O

C The

C, The block, cords, and pulleys, for raising and suspending the upper part of the bath, or for opening and closing it.

D, The weight to counterpoise the upper or moveable part of the bath.

E, A strong wire rod fastened into the counterpoise weight, to open or shut the bath.

G, The step-ladder to enable the bather to go in or come out of the bath.

H, The steam-boiler.

I I, Tin tubes for conveying the steam into the bath when wanted, or to carry off the steam into the chimney, or open air, when not employed, or when produced in too great quantities.

K K, Stop-cocks for regulating the direction of the steam, and the temperature of the bath.

The dotted line L, shows the position of the steam-diffuser, which is also shown separate in fig. 2.

The dotted line M, the position of the strong frame, or grating, fig. 3, for supporting the weight of the bather.

The dotted line N, the position of the flooring or sieve, fig. 4, which is to be laid upon the strong grating.

O, The seat or step, fig. 5, the foot of which rests on the flooring, or sieve, and the seat part on a bracket within the bath.

P, An occasional seat, fig. 6, to be used upon fig. 5, when the bather is so low that his head would not otherwise rise above the aperture prepared in the top part of the bath. In its general use, as a steam-bath, the head should be raised above the surface, and the steam retained within by napkins lapped round the bather's neck.

Q, A thermometer, placed to ascertain the heat of the bath.

R, A cock for drawing off the water of condensation.

S, The

S, The frame with castors to move the apparatus from one place to another.

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*To use the Apparatus for total immersion in Steam.*

Fig. 7, shows a contrivance for total immersion in vapour or steam. It is a light vessel, eighteen inches deep, well hooped, and made to fit at its wider end on the top of the bath.

a, An aperture for a tube for the bather to breathe through.

b, A glass sky-light, to obviate any objection against bathing in the dark.

c, An aperture for a thermometer in vapour bathing, or to admit a funnel when the apparatus is wanted to form a shower-bath.

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*To use the Apparatus as a Shower Bath.*

A tin vessel for holding the water is placed upon pivots, turning in grooves, in the situation shown by the dotted lines *d*, fig. 7; a tin cullender of the form, fig. 8, is then suspended by a small cross-bar across the aperture of the upper part of the wine pipe, and a circular curtain of linen or calico, from three to four feet deep, of the form, fig. 9, is fastened upon the outside of the lower rim of the upper or moveable part of the bath, which forms a complete shower-bath on the water being discharged from the tin vessel, through the numerous small holes of the cullender, on the person within the bath.

Fig. 8, shows separately the cullender or perforated tin vessel of the shower-bath, with its loop and rod to suspend it from the aperture above-mentioned.

Fig. 9, is a separate view of the curtain before-mentioned, mounted upon its hoop, ready for fixing upon the lower rim of the upper part of the cask, above the division B, and being thus placed when the moveable part of the bath is elevated, it not only conceals the bather from the observation of attendants, but also prevents the water, as it descends, from being scattered out of the bath.

This curtain should also be used in steam-bathing, as it enables the bathers to dress and undress in the bath, with much delicacy and comfort.



*To use the Apparatus as a Sudatory, or Warm-Air Bath.*

Fig. 10, is a tin box, in the form of a ring, for heating the bath as a stove; it contains about eight square feet of surface, and ought to be painted black, in order to increase its radiating powers; T shows the aperture for the steam tube; V is an aperture to allow the escape of a portion of the steam into the air, and thereby to obviate the inconvenience of the lid of the boiler being forced off.

This part of the apparatus is of considerable importance, as it enables the bath not only to be used in certain cases as a stove bath, but the whole bath may be speedily dried by its means, and thereby meet the more delicate feelings of some bathers who may be obliged to use the bath after others.

Fig.

*Dr. Cummings' Vapour Bath.*

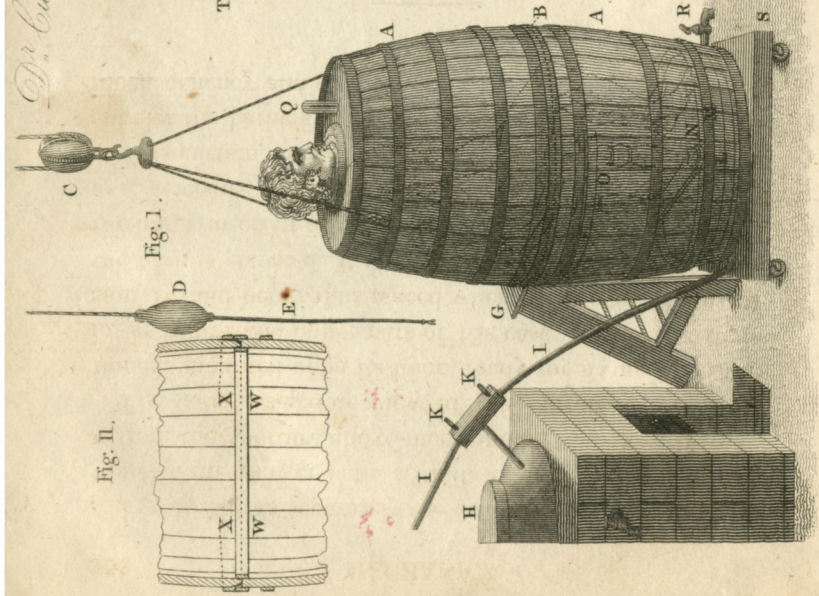


Fig. 3.

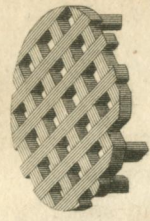


Fig. 2.



Fig. 10.

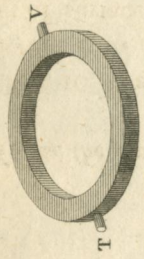


Fig. 5.

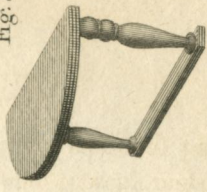


Fig. 6.

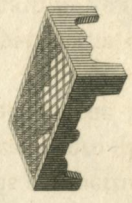


Fig. 4.

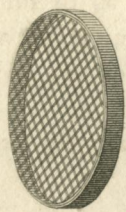


Fig. 9.

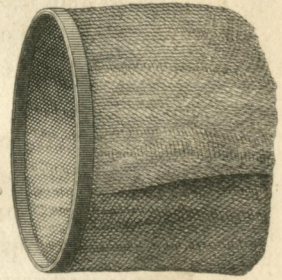


Fig. 7.

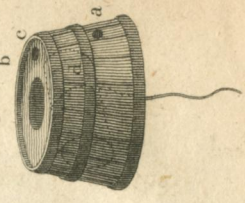


Fig. 8.



*Drawn by J. Farg.*

*Engineed by S. Prier.*

Fig. 11, is a section of the wine pipe or bath, where the junction of the upper and lower parts take place ; W W, show the groove made by the two iron hoops, between which the small portion of the wood of the upper part of the wine pipe left below the circle or iron hoop, X X, enters and forms a close joint.

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*Extract from the Report of the General Dispensary at Denbigh, for the year 1811.*

RESOLVED, That the Thanks of this Meeting be given to Dr. Cumming, for his present of an *Improved Vapour Bath*, and that he be requested to publish an account thereof, it being well calculated, from its simplicity, cheapness, and efficacy, to bring into general use an agreeable and salutary practice, as well as a powerful remedy in many diseases well known in this country in former times, but till lately neglected, and in a manner forgotten.